

PROCEEDINGS  
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BIOLOGICAL SOCIETY OF WASHINGTON

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NOTES ON AND A KEY TO SPECIES OF *CINARA*  
(FAMILY APHIDAE) WHICH HAVE *ABIES* SP. AS HOST

By F. C. HOTTES

It is a pleasure to acknowledge the assistance of Louis Gentner, Carl Johansen and Joe Schuh who are fortunate to live in a region where *Abies* sp. are abundant, and who have supplied me with much of the material treated in this section.

*Cinara abieticola* (Cholodkovsky)

*Lachnus abieticola* L., 1899. Zool. Anz. 22: 470-471, fig. Original description apterous viviparous female.

*Lachnus vanduzeei* Swain, 1919. A Synopsis of the Aphididae of California, pp. 50-51, fig. Pl. V.

*Lachnus piceae* (Walker), 1921. Swain Ent. News, 32: 225-227.

*C. abieticola* (C) Hottes and Essig, 1954. Proc. Biol. Soc. Washington, 67: 95-96, figs. p. 97.

Location of type not known.

Size range apterous viviparous females up to 5.75 mm.

I have seen slide material of this species from Europe and from our Eastern and Western Coasts, but have never taken it alive. It is reported to spend the summers on the roots of *Abies* sp. This species is very close to *C. lasiocarpae* (G & P). It differs from that species in having the hairs on the cornicles contrasting sharply in texture, in having the second tarsal segment shorter and the hairs on the tibiae much longer, and more upstanding.

This species is not confined to one species of *Abies* but has also been taken on *Picea* and *Cedrus*.

*Cinara alacra* Hottes and Essig

*Cinara alacra* Hottes and Essig, 1953. Proc. Biol. Soc. Washington, 66: 205-206, figs. p. 210. Original description apterous viviparous female.

Holotype in collection of E. O. Essig.

Size apterous viviparous female 4.57 mm.

This species is known only from the apterous viviparous female. The features which characterize this species are the cornicles with two types of hair, the course spine-like hairs on the tibiae and the numerous coarse





Holotype and other types in the United States National Museum.

Size range apterous viviparous female 3.29–3.50 mm.

The alate viviparous female of this species has not been taken.

The transverse pigmented spots of this species are very irregular and have tooth-like projections on the margins. The cornicles extend further forward from the oriface than posterior, and the restricted portion is not as dark as the outer margin. The outer hairs on the metathoracic tibiae are much coarser than the hairs on the inner margin, quite upstanding and considerably longer than the width of the tibiae. This species is known from Washington and Oregon. This species is known only from *Abies lasiocarpa*.

*Cinara curtihirsuta* Hottes and Essig

*Cinara curtihirsuta* Hottes and Essig, 1954. Proc. Biol. Soc. Washington, 67: 275–276. Original description alate viviparous female.

Hottes, 1957. Proc. Biol. Soc. Washington, 70: 15–16, description apterous viviparous female, figs.

Holotype in collection of E. O. Essig. Morphotype in the collection of the United States National Museum.

Size range apterous viviparous female 3.67 mm.

This species is probably more widely distributed than published records indicate. I have taken it in Oregon and in Arizona, always on *Abies concolor*, the host on which the first material was taken. In life, this species is outstandingly conspicuous; the head is a dull pinkish red and the body gray, slightly pruinose. Arizona specimens were just as conspicuous as the specimens taken in Oregon but were of one color, being a light amber and almost translucent.

Alate specimens have the sensoria on the third antennal segment numbering up to ten. They are arranged in a straight row and are very large. The hairs on the antennae are about .03 mm long in the apterous form and slightly longer in the alate. The metathoracic tibiae have the hairs varying from .03–.04 mm. The hairs on the cornicles are almost confined to the restricted portion of the cornicle.

Specimens of this species feed on the terminal branches among the needles and on the upper portion of the trunks of young trees.

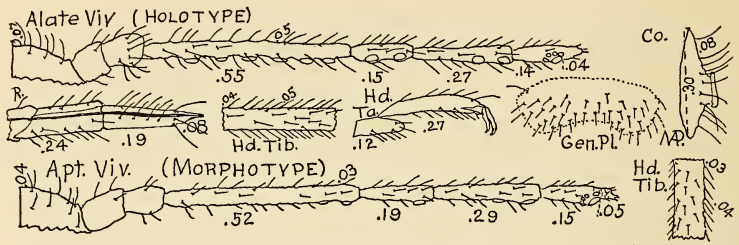
*Cinara curvipes* (Patch)

*Lachnus curvipes* (Patch), 1912. Maine Agric. Exper. Sta. Bull., No. 202, pp. 161–163. Original description of all forms; figures. Types in the collection of the Maine Agricultural Experiment Station; so far as known lectotype not indicated.

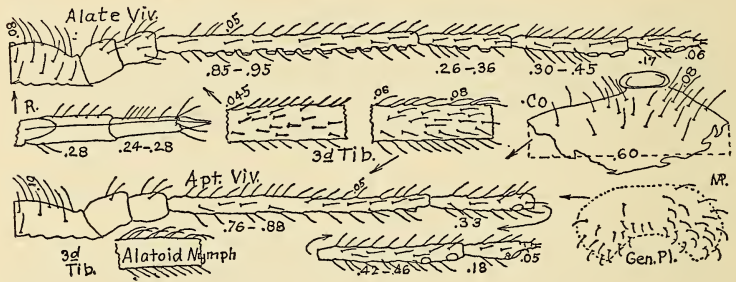
*Cinara utahensis* Knowlton and Smith, 1938. Ent. News, 49: 66–68, figs. Synonym.

Size range of apterous viviparous females up to .05 mm.

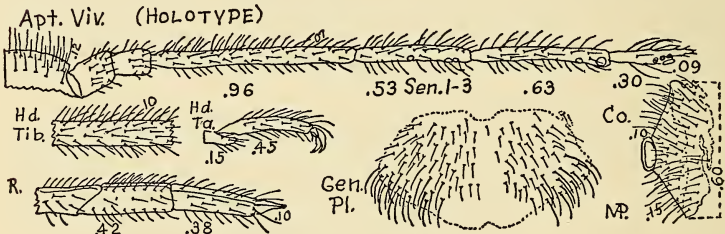
This species is widely distributed in the United States and probably occurs wherever *Abies* sp. grow. I have taken it on *Abies concolor*, *Abies*



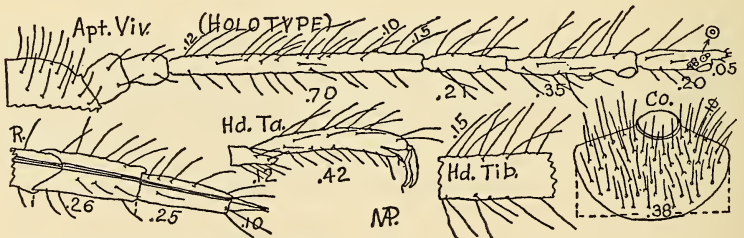
**CINARA CURTIHIRSUTA H.&E.**



**CINARA CURVIPES (P.)**



**CINARA GENTNERI H.**



**CINARA GRANDE H.**

*lasiocarpa*, *Abies grandis*. Palmer records it from *Picea engelmanni*, and Essig has taken it on *Cedrus deodora*.

The hairs on the antennal segments and tibiae of this species may differ as to type. Sometimes the hairs on these structures are short and blunt at the end; at other times the hairs are longer with the apical half very fine and drawn out to a fine, droopy point. The hairs on the tibiae, regardless of type, are always shorter than the width of the tibiae. The hairs on the cornicles are confined largely to the restricted portion. Specimens of this species live on the bark of young branches and on the trunks of young trees. The hind tibiae are given to much variation as to length but are always more or less bent, a condition shared by many species of this genus.

*Cinara gentneri* Hottes

*Cinara gentneri* Hottes, 1957. Proc. Biol. Soc. Washington, 70: 1-3, figs. p. 8. Original description apterous viviparous and oviparous females.

Holotype and morphotype in the United States National Museum.

Size range apterous viviparous female 5.55-5.77 mm.

The alate viviparous female and the male of this species have yet to be described. The genital plate of this species is the most characteristic feature of this rather large species; it is large and one-half as deep as it is wide; it is provided with numerous hairs.

This species is known only from Oregon and *Abies grandis* is its only known host.

*Cinara grande* Hottes

*Cinara grande* Hottes, 1956. Proc. Biol. Soc. Washington, 69: 219-220, figs. p. 223. Original description apterous viviparous female.

Holotype in the United States National Museum.

Size range apterous viviparous females 4.80-5.10 mm.

This species, known from only one collection, has defied repeated efforts to add additional forms to our knowledge. So effectively has it eluded me that I suspect that it migrates to the roots, and that my collecting trips were not correctly timed. Specimens of this species have no pigmented spots on the dorsum of the abdomen. The cornicles have numerous hairs, all of one type. The hairs on the metathoracic tibiae are longer than the width of the tibiae and quite upstanding.

Known from *Abies concolor* on which it was taken from the trunk of a young tree.

*Cinara hirta* Hottes and Essig

*Cinara hirta* Hottes and Essig, 1953. Proc. Biol. Soc. Washington, 66: 209-210, figs. p. 210. Original description apterous viviparous female.

Holotype in collection of E. O. Essig.

Size range apterous viviparous females 3.43-4.00 mm.

Despite repeated efforts to collect additional forms of this species, it

is known only from the apterous viviparous form. I have taken this species on *Abies concolor* in the Santa Catalina Mountains near Tucson. They were located on the twigs among the needles and were taken solitary. The specimens were a light uniform buff. The body hairs of this species are very abundant, so that the body appears to be covered with fur, the hairs overlapping one another. At the apex the hairs suggest the apex of a nail. The anterior and posterior margins of the cornicles lie within the lateral pigmented areas, so that the extent of the cornicles in these directions is difficult to determine.

*Cinara kiusa* Hottes

*Cinara kiusa* Hottes, 1957. Proc. Biol. Soc. Washington, 70: 3-4, figs. p. 8. Original description apterous viviparous female.

Holotype in the United States National Museum.

Range in size apterous viviparous females 3.25-3.67 mm.

This species is known only from the original collection of apterous viviparous females, taken at Bly, Oregon, on *Abies concolor*. The antennal segments of this species have numerous rather short, fine hairs for the most part not longer, or but little longer, than the width of third segment. The unguis is finger-like. The hairs on the tibiae are numerous, fine and shorter than the width of tibiae.

To locate *Abies concolor* near Bly one must continue on the highway east of Bly for ten or twelve miles and turn left on a forestry road, just as the highway turns downhill to the right. This area has given us four little known species of *Cinara*.

*Cinara lasiocarpae* (Gillette and Palmer)

*Lachnus lasiocarpae* Gillette and Palmer, 1930. Ann. Ent. Soc. America, 23: 543-544, figs. pp. 550-551. Original description apterous viviparous female.

*C. lasiocarpae* (Gillette and Palmer), Hottes, 1954. Proc. Biol. Soc. Washington, 67: 259-260. Description alate viviparous female.

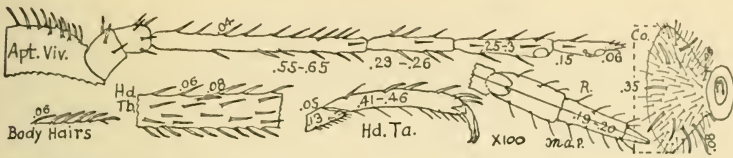
*C. lasiocarpae* (Gillette and Palmer), Hottes, 1955. Proc. Biol. Soc. Washington, 68: 73-75, fig. p. 68. Description alate male.

Type in the United States National Museum.

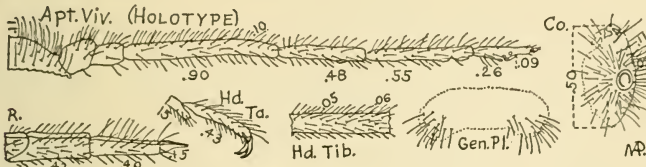
Size range apterous viviparous female 4.00-5.00 mm.

This species so far as known is confined to *Abies lasiocarpa*. It seems to be confined to the Rocky Mountain region. It is closely allied to *C. abieticola* (Cholodkovsky) and differs from that species in having shorter hairs on the tibiae which are also less upstanding, shorter second tarsal segments, and the two types of hairs on the cornicles less strongly differentiated.

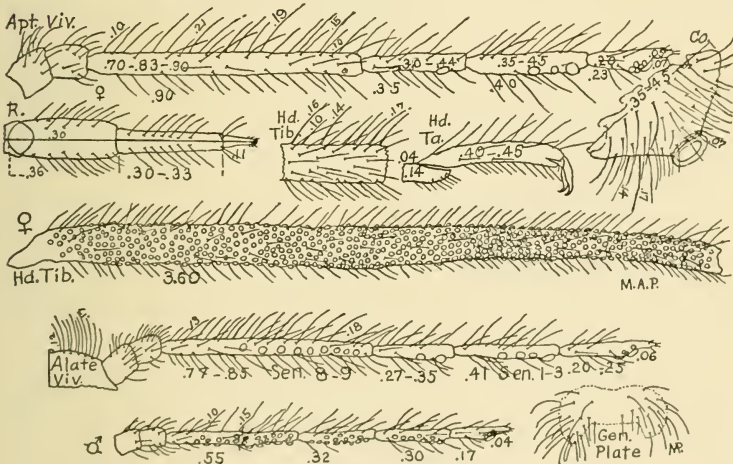
Specimens of this species are to be found on the trunks of small trees in the spring and fall, perhaps they migrate to the roots in the summer.



**CINARA HIRTA H.&E.**



**CINARA KIUSA H.**



**CINARA LASIOPARPAE (G.&P.)**

*Cinara minuta* Hottes and Knowlton

*Cinara minuta* Hottes and Knowlton, 1954. The Great Basin Nat., 14: 11, figs. p. 12. Original description oviparous female.

Holotype in the United States National Museum.

Size range oviparous females 2.28-2.36 mm.

Although this species is known only from the oviparous form, apterous viviparous females are not expected to differ greatly. The small size of this species, its comparatively small cornicles and short hairs separate it at once from other species taken on *Abies lasiocarpa*.

*Cinara occidentalis* (Davidson)

*Lachnus occidentalis* Davidson, 1909. Jour. Econ. Ent., 2: 300. Original description apterous viviparous female.

*Lachnus occidentalis* Davidson, Wilson, 1912. The Canadian Ent., 44: 193-194. Description of all forms.

*Lachnus occidentalis* Davidson, Palmer, 1926. Ann. Ent. Soc. America, 19: 308-311. Life history and description and figures of all forms.

Palmer lists the type as possibly in the United States National Museum. Size range 2.5-3 mm.

The long, numerous upstanding hairs on the comparatively short tibiae, and the long second tarsal segments distinguish this species.

I have seen material of this species from California and Washington, and have taken it in Colorado, Arizona, Nevada and Oregon. Specimens of this species live in small colonies at the ends of twigs. Specimens are quite flocculent, so that the colonies present a distinctly bluish white appearance. The flocculent material holds small globules of honey dew.

*Cinara osborni* Knowlton

*Cinara osborni* Knowlton, 1942. Great Basin Nat., 3: 7, figs. p. 6. Original description apterous viviparous female.

*Cinara alticola* Hottes and Essig, 1953. Proc. Biol. Soc. Washington, 66: 151-152, figs. p. 154.

Type in Knowlton collection.

Size range of apterous viviparous females 3.5-4.00 mm.

Only the apterous viviparous female of this form is known. It is allied to *C. hirta* and differs from that species in the hairs on the dorsum of the abdomen being longer and tapering to a sharp point. The hairs on the abdomen are less numerous than in *hirta*.

I have taken this species in Arizona and Nevada, and have seen specimens from California. I have taken it on both *Abies concolor*, a new host, and *Abies lasiocarpa*. It varies considerably in color but is never a pale tan. In the region of the Grand Canyon the thorax has four black spots and the abdomen is gray, lightly covered with pruinose. Specimens of this species live solitary on the twigs.

*Cinara pacifica* (Wilson)

*Lachniella pacifica* Wilson, 1919. The Canadian Ent., 51: 21. Original description of alate viviparous female.

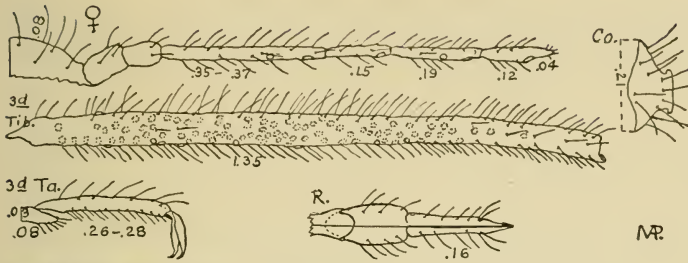
*Cinara pacifica* (Wilson), Palmer, 1945. Ann. Ent. Soc. America, 38: 451. Description and figs.

Type possibly in the United States National Museum.

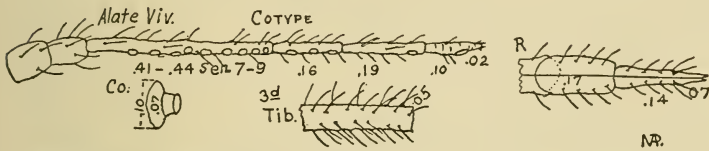
Size range alate viviparous females given by Palmer as 1.86 (?).

This species is known only from the original material taken by A. D. Hopkins and Theo. Pergande in 1903 at Eureka, California. I looked for this species in northern California in 1958, and made a special trip

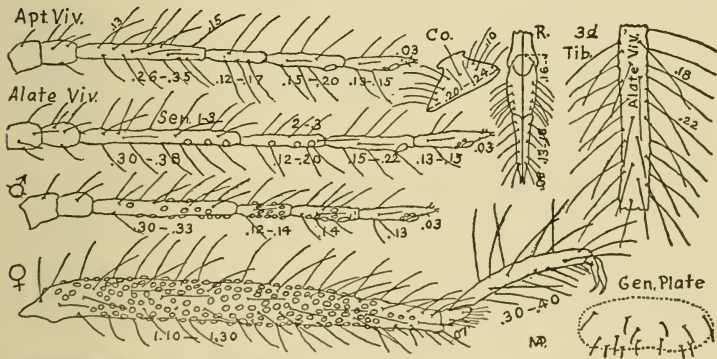




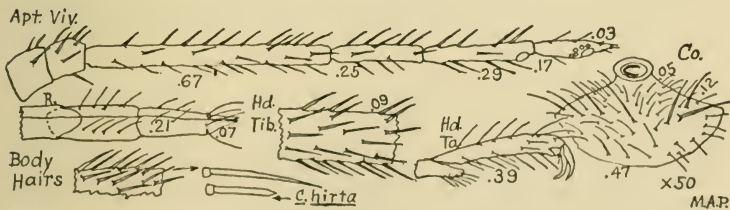
CINARA MINUTA (H.&K)



CINARA PACIFICA (W)



CINARA OCCIDENTALIS (D.)



CINARA OSBORNI K.

to Eureka which must have changed greatly since 1903. I would expect the apterous viviparous females to have cornicles and hairs quite similar to those of the alate form and have keyed the species on the character of the unique cornicles.

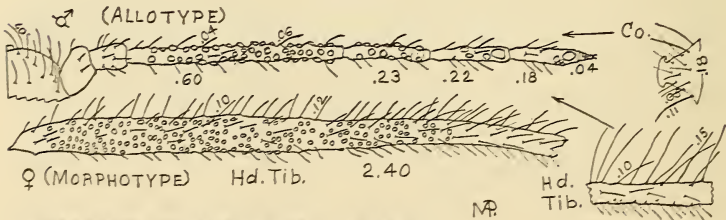
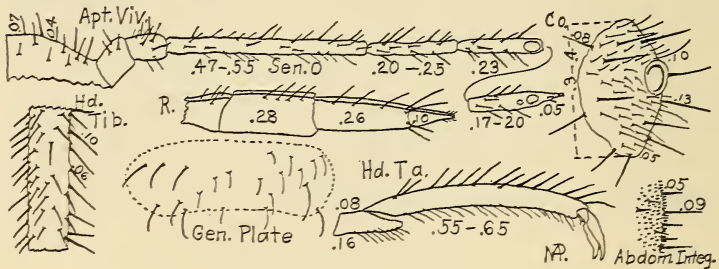
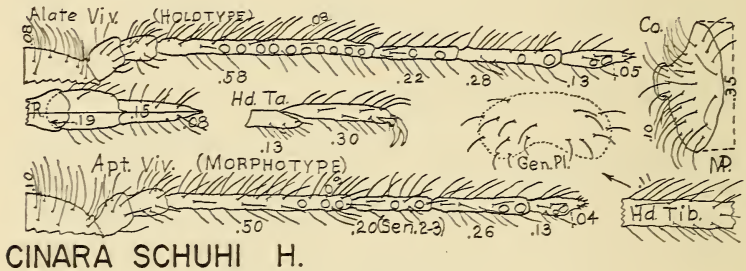
*Cinara schuhi* Hottes

*Cinara schuhi* Hottes, 1957. Proc. Biol. Soc. Washington, 70: 4-6, figs. p. 8. Original description alate and apterous viviparous females.

Holotype and morphotype in the United States National Museum.

Size range apterous viviparous females 2.55-2.85 mm.

No species now known from *Abies concolor* has the hair on the tibiae similar to the hairs on the tibiae of this species. Apterous viviparous females may have up to five large round sensoria arranged in a straight row, more than any other species on this host.





Size range 5.27–7.00 mm.

The cornicles of this species have a deep notch on the outer margin. This feature separates it at once from its closely related species *C. abieticola*.

A KEY TO APTEROUS VIVIPAROUS FEMALES OF THE GENUS *CINARA*  
(FAMILY APHIDAE) WHICH HAVE *ABIES* SP. FOR HOST

1. Cornicles with a diameter of less than .25 mm ..... 2  
    Cornicles with a diameter of more than .30 mm ..... 4
2. Cornicles with a diameter of .10 mm ..... *C. pacifica* (Wilson)  
    Cornicles with a diameter of about .20 mm ..... 3
3. Hair on metathoracic tibiae shorter than width of segment;  
    second metatarsal segment about one-fifth the length of hind  
    tibiae ..... *C. minuta* Hottes and Knowlton  
    Hair on metathoracic tibiae longer than width of segment;  
    second metatarsal segment about one-third length of hind  
    tibiae ..... *C. occidentalis* (Davidson)
4. Cornicles provided with coarse and fine hairs ..... 5  
    Cornicles with only one type of hair ..... 12
5. Dorsum of abdomen with well-developed setulae, transverse  
    pigmented spot not divided or only partially so .....  
    ..... *C. setulosa* Hottes and Essig  
    Dorsum of abdomen without or with poorly developed setulae,  
    transverse pigmented spot divided ..... 6
6. Hairs on metathoracic tibiae shorter than or about equal to width  
    of tibiae ..... 7  
    Hairs on metathoracic tibiae longer than width of tibiae ..... 9
7. Cornicles incorporated within lateral pigmented areas ..... 8  
    Cornicles not incorporated within lateral pigmented areas .....  
    ..... *C. alacra* Hottes and Essig
8. Hairs on dorsum of abdomen with apex similar to apex of a nail,  
    not tapering to a sharp point ..... *C. hirta* Hottes and Essig  
    Hairs on dorsum of abdomen tapering to a sharp point .....  
    ..... *C. osborni* Knowlton
9. Size not much over 3.5 mm ..... *C. chinookiana* Hottes  
    Size 4.00–7.00 mm ..... 10
10. Cornicles with deep notch ..... *C. sonata* Hottes  
    Cornicles without notch ..... 11
11. Second tarsal segment .42–.50 mm; hairs on hind tibiae .12–.17  
    mm upstanding but not nearly at right angles; hairs on cornicles  
    not sharply differentiated as to two types .....  
    ..... *C. lasiocarpae* Gillette and Palmer  
    Second tarsal segment .38–.41 mm; hairs on hind tibiae .15–.30  
    mm almost at right angles; hairs on cornicles distinctly of two  
    types ..... *C. abieticola* (Cholodkovsky)
12. Metathoracic tibiae with blunt hairs ..... *C. curvipes* (Patch)  
    Metathoracic tibiae with sharp pointed hairs ..... 13

13. Genital plate one-half as long as wide with many hairs .....  
 Genital plate much less than one-half as long as wide, hairs  
 largely confined to ends ..... 14  
 ..... *C. gentneri* Hottes
14. Hairs on mid region of metathoracic tibiae longer than width of  
 segment ..... 15  
 Hairs on mid region of metathoracic tibiae shorter than width of  
 segment ..... 16
15. Hairs on metathoracic tibiae .15 mm in length set at angle of  
 more than 45 degrees; hairs on cornicles covering entire surface  
 ..... *C. grande* Hottes  
 Hairs on metathoracic tibiae .10-.11 mm in length set at angle  
 of 45 degrees; hairs on cornicles less numerous towards margin  
 ..... *C. schuhi* Hottes
16. Hairs on metathoracic tibiae set at angle of 45 degrees, not finer  
 beyond middle, not strongly curved ..... 17  
 Hairs on metathoracic tibiae set at angle of less than 45 degrees,  
 much finer beyond middle, strongly curved towards apex .....  
 ..... *C. curvipes* (Patch)
17. Hairs on metathoracic tibiae less than .03 mm; third antennal  
 segment .51-.57 mm in length ..... *C. curtihirsuta* Hottes and Essig  
 Hairs on metathoracic tibiae .05-.075 mm in length; third an-  
 tennal segment .82-.91 mm in length ..... *C. kiusa* Hottes